

Abstract

A structure having a substrate, patterned metal layer and a catalyst island formed on the metal layer. The surface of the substrate upon which the metal layer is formed may be oxidized. As an illustrative example, the metal may be HfN and the catalyst island may be iron, nickel, or the like. The resulting structure may be placed in an environment having a carbon-containing gas, a temperature between 500 and 1200 degrees C, and an electric field. A nanotube may grow from the catalyst island. A method including the combining of hafnium and nitrogen may be used to make the nanotube growing structure.